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Waste Minimization: Reducing Releases of Chlorinated Solvents

Ford Motor Company

- Reduction in Releases of Chlorinated Solvents
- Avoided CAA Reporting Requirements
- Design Change Was Waste Minimization Opportunity

It is comparatively easy to implement a waste prevention project early in the design process as opposed to trying to work changes in later. "Doing it right the first time is always easier and cheaper than retrofitting later!"

What Does the Ford Ypsilanti Plant Do?

The Ypsilanti plant (just outside of Detroit, Michigan) manufacturers starters for Ford products. Originally, the plant manufactured a "field-wound" starter. In 1991, a new product, called a "permanent magnet" starter was introduced as part of an ongoing effort to improve product quality. The new starter was smaller than the field-wound type, thereby reducing the weight of the part and the vehicle. In addition, the new starter replaced a copper ring with tubing, which eliminated a welding step and reduced the need for cleaning.

What Did They Accomplish?

The Ypsilanti plant was scheduled to undergo a design change to phase out the field-wound starter and phase in the permanent magnet type. This design change necessitated the purchase of new equipment. Ford used this opportunity to evaluate possible changes to reduce or eliminate the use of chlorinated solvents. The end result? Ford estimates that over 30,000 pounds of trichloroethylene (TCE) and about 5,000 pounds of methylene chloride releases are being eliminated annually.

Environmental Achievements

At the time of the product change, the plant was participating in EPA's 33/50 Program and in Michigan's Great Lakes Auto Project. Both programs had lists of hazardous chemicals targeted for reduction; each list included TCE and methylene chloride.

The design change was a perfect opportunity for the plant to demonstrate its support for these voluntary environmental programs while improving product quality.

When the new starter was being developed, manufacturing engineers replaced the methylene chloride and TCE-based cleaning and drawing chemicals with a water-based compound. This change eliminated TCE and methylene chloride releases and the plant no longer disposes of liquid hazardous waste from the dip tank.

Regulatory Relief

At the time the project was implemented, the Clean Air Act's (CAA) permitting requirements were not in place. The plant phased out the use of these two chlorinated chemicals just before the regulation became effective. The chlorinated solvent phase-out saved the plant

from having to report on the two chemicals under the CAA.

The Implementation Process

The Ford Ypsilanti plant's business and product cycles routinely include consideration of environmental issues. In doing so, the plant's manufacturing engineers developed the approach to the chlorinated solvent reduction project. Staff had to be acquainted with the new solvents, but this was only a small part of the overall training that employees received to adapt to the plant's overall design change.

The design change took about two years to complete. To measure success of the project, the plant uses standard cost accounting procedures and tracks overall solvent use.

Economics

The project was incorporated into the design change budget, which used funds set aside for new product development. The design change cost Ford Motor Co. about $50 million, but the percentage of that amount spent on the process to eliminate the use of chlorinated solvents is unknown.

The plant used to spend approximately $45,000 on chlorinated solvents annually. The current expenditure on water-based solvents is approximately $20,000, for a total raw material annual savings of $25,000. In addition, the plant no longer pays to dispose of the hazardous liquid waste from the dip tank.

Hurdles

The solvent change caused minor disruptions in manufacturing for a short time and caused a few minor technical problems. The plant overcame these problems by consulting the solvent suppliers and the manufacturing engineers, and simply by becoming familiar with the new water-based materials.

Words to the Wise

Phil Lawrence, Principal Staff Engineer from Ford's Environmental Quality Office, and Jim Luckhardt, Ford Environmental Engineer, are quick to acknowledge how well the solvent change fit into the plan for the plant's design change. They stressed the comparative ease of implementing any waste prevention project early in the design process as opposed to trying to work changes in later.

"Doing it right the first time is always easier and cheaper than retrofitting later!" - Phil Lawrence

WASTE MINIMIZATION NATIONAL PLAN

Reducing Toxics in Our Nation's Waste